

1047-11-81

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Functions on the adèles of a curve over a finite field have two kind of products: multiplication and convolution. The operator algebra generated by these two kinds of operators has an action of the ideles, which gives a noncommutative quotient space with an action of the idele class group. We will explain how this noncommutative dynamical system may provide the framework for Connes' idea for the Riemann hypothesis, and hence yield a new proof of Weil's theorem. (Received January 16, 2009)